

Introduction to Coastal GIS

Introduction

Overview, GIS Theory, and the Study Area

Exercise A

Find and Import Data

Lecture

Introduction to Metadata

Exercise B

Using Metadata to Determine Suitability



NOAA Coastal Services Center
LINKING PEOPLE, INFORMATION, AND TECHNOLOGY

Estimated Length: 2.5 hours

Module Introduction

Overview

The coast is a dynamic setting rich in natural resources. A geographic information system (GIS) is the perfect tool for managing those resources.

An important part of any GIS is the creation of metadata that describe the data. Metadata records document geospatial data in a consistent form and help you find data of interest, determine the usefulness of the data, and determine how to access the data.

In this exercise you will first locate spatial data of interest on the Internet. Once you have the spatial data, you will then develop the metadata. Finally, you will incorporate all of the information into a geodatabase and gain an understanding of basic geodatabase functionality.

Skills Learned

- Understand the coastal setting and how a GIS can be used to manage the resources
- Find and Locate Geographic Data
- Develop Metadata

Tools and Technology

ArcGIS Components

- ArcMap
- ArcCatalog
- ArcToolbox

Supporting Software:

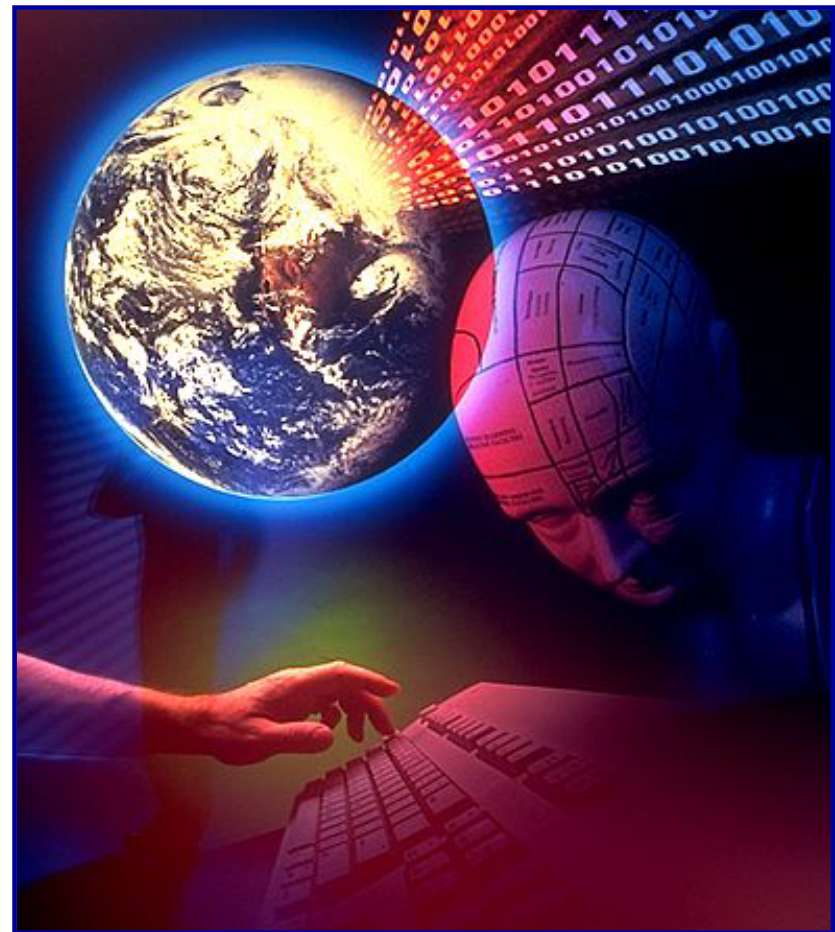
- StuffIt Expander®
- Microsoft® Internet Explorer



Introduction: Overview

Coastal GIS

- Geographic information systems (GIS) provide the coastal resource management community with an opportunity to
 - Examine the effects of population growth on natural resources
 - Create protected areas for habitat management
 - Examine the spatial distribution of species over time
 - Create and update marine boundaries
 - Perform hazards management
 - Other issues?
- We would not be able to perform any of these without accurate geospatial data



Introduction: GIS Theory

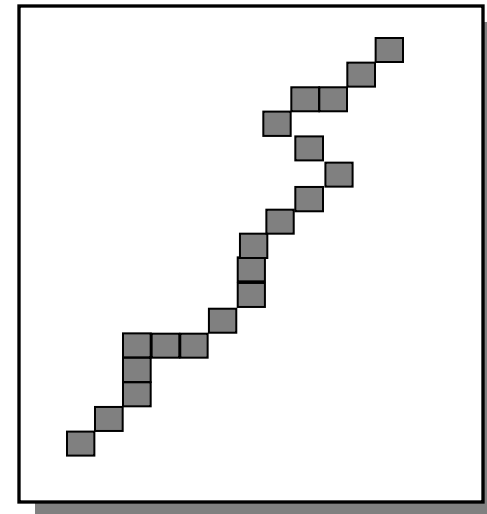
Vector Data sets

- A representation of a spatial phenomenon as a series of points, lines, or areas
- Points are referenced to a spatial coordinate system, lines to points, and areas to their lines
- Each entity has an ID, which is linked to attribute data in a separate database file



Raster Data sets

- A representation of a spatial phenomenon as a series of grid cells, or pixels
- Point phenomena are represented as single cells, lines as a series of connected cells, and areas as groups of connecting cells
- Each pixel has an associated value or array of values



Introduction: GIS Theory

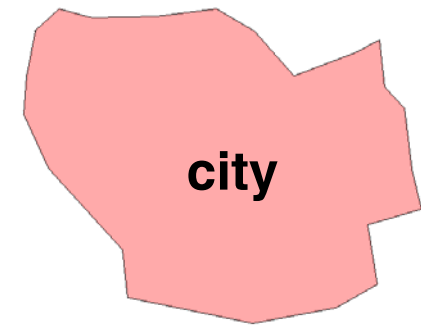
Scale

- Remember, spatial data sets are only representations of real-world phenomena
- Scale determines the size and shape of features in a GIS
- At larger scales, many spatial phenomena are represented as areas
- As you decrease the scale of the map, many phenomena are represented as points or lines

Large scale



1:500



1:24,000

Small scale



1:24,000



city

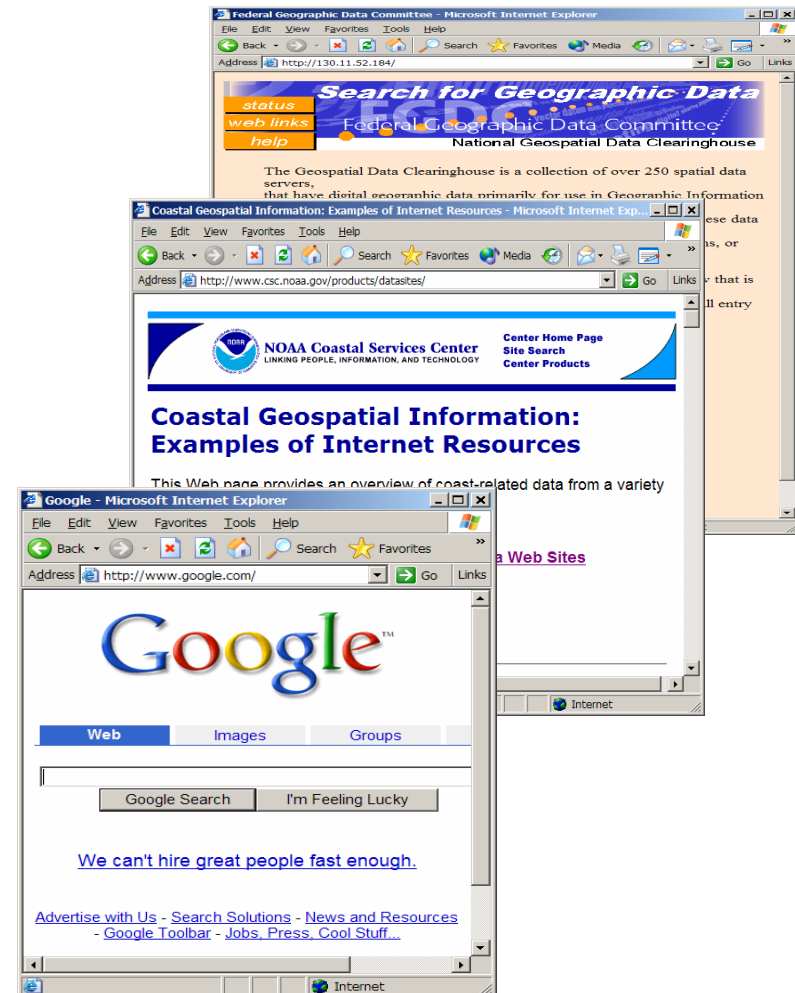
1:250,000



Introduction: GIS Theory

Accessing Geospatial Data

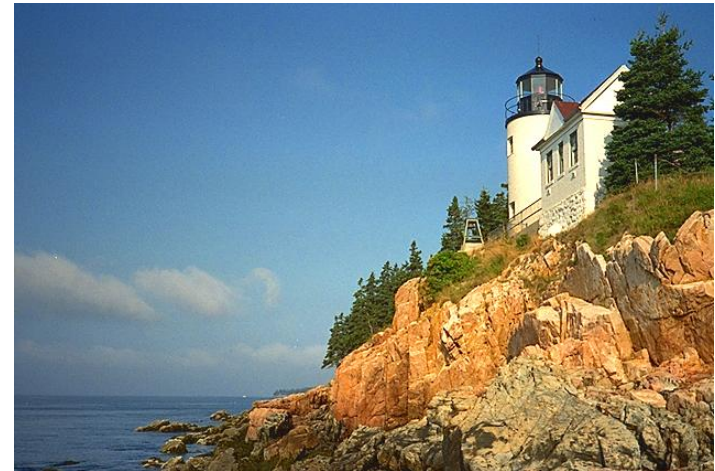
- It is possible today to access vast amounts of geospatial data over the Internet.
- Sources include search engines, existing lists and collections, and clearinghouses.
- There are hurdles with data obtained on-line:
 - Locating it
 - Cost
 - Accuracy
 - Format
 - And others...



Introduction: Study Area

Maine Coastline and Population

- Physical Geography
- Conservation
- Diverse Ecology and Economy



Exercise A: Find and Import Data

Background

You have been hired to head up the newly formed Office of Coastal Management in Cumberland County, Maine. Unfortunately, Cumberland County has not been using GIS technology and has no digital data available for you to use, and they have also spent most of the first year's budget on your salary and technology purchases. The county commissioners want to see some GIS products from you in a few weeks when they bring you before the town meeting. What are you going to do!?! Not panic, that's what. Being the intelligent coastal management professional you are, you know where you can obtain data that will wow the commissioners and showcase your GIS skills. After that you can get down to the business of preserving the pristine coastline and abundant natural resources, the real reason you took this job.

Goal

After hearing the lecture and working through the exercises, the student will be able to recognize data needs and determine where to start looking for it. The student will also be aware of different data formats and understand the pros and cons of each.

Objectives

1. Browse various data sources available on-line
2. Download data for use in the GIS
3. View data in ArcCatalog



Exercise A: Find and Import Data

Summary of Process Steps

1. **Locate NOAA Coastal Services Center shoreline data sets** – Using the Center's Web resources, locate shoreline data for the coast of Maine
2. **Use Internet to access Digital Chart of the World (DCW) data** – Navigate to Penn State's DCW Web site and download shoreline data for Maine coast
3. **Download data sets using FTP** – Use File Transfer Protocol to access and download data from NOAA's Special Projects Office
4. **Use ArcCatalog to Access Internet Data** – Utilizing ArcCatalog's networking capabilities, access and use data over the Internet
5. **View coastal data in ArcMap** – Import and analyze downloaded shoreline data sets

Data

No spatial data will be provided for this exercise.

Tools to Use

- Internet Explorer, Netscape[®] Navigator, or similar Web browser
- StuffIt Expander[®], or similar file compression utility
- ArcCatalog
- ArcMap
- ArcToolbox



Exercise A: Find and Import Data

1. Locate Center shoreline data sets

- ▶ *Oftentimes the work of searching for data has already been done for you. Organizations often provide links to existing data to aid users in finding what they need to perform their work.*
- ❑ In Internet Explorer, type in **www.csc.noaa.gov** in the address bar and press enter. This is the home page of NOAA's Coastal Services Center. Notice that several options are available to you on the left-hand side of the page, under Products and Services. Click on the option labeled **Data and Standards**.
- ▶ *This page provides you several links that are much more focused on coastal management issues than Google or other generic Internet search engines.*
- ❑ For our purposes here today click on **Coastal Geospatial Information: Examples of Internet Resources**, under the Downloadable Data section.
- ▶ *At this Web site you will not find data but rather links to various organizations that will have data relevant to what you do. This saves you time and the effort of sorting through tens of thousands of hits that would be returned by a Google search.*
- ❑ Take a moment to browse this list of links.
- ? Can you think of any other Internet sites for downloading geospatial data?

Web Sites

For more information about NOAA Coastal Services Center projects and products for the coastal resource management community, visit

www.csc.noaa.gov



Exercise A: Find and Import Data

1. Locate Center shoreline data sets (continued)

❑ Go back to the NOAA Coastal Services Center Web page **www.csc.noaa.gov**.

▶ *Notice we are back where we started. The previous step was to show you examples of other Web resources available to you.*

❑ Now add an addition to your web address **www.csc.noaa.gov/shoreline**. On the left side of the page click on **Download Historical Shoreline**.

▶ *From this page you can view more information about this NOAA project, check availability, and select the format for the downloaded data. If you click on **View a Map of Data Availability** you will see that the State of Maine is complete. Click the **Back** button.*

❑ Scroll down and find the state of Maine. To start the download you would simply click on Maine's shapefile, **meshr.zip** to download it. **DO NOT** download this data set. To save time, this data set has been included in your Student folder.



Exercise A: Find and Import Data

1. Locate Center shoreline data sets (continued)

- ▶ *You will view the metadata in the next exercise. Now you need to unzip the shoreline data and view them in ArcCatalog.*
- ❑ Minimize Internet Explorer and go to Start > Programs > Accessories > Windows Explorer. Navigate to your student folder where you saved the Maine shoreline shapefile.
- ▶ *As you can see, the file is in a compressed .zip format. This is a very common format for compressing the size of spatial data sets so that they can be downloaded faster over a slow Internet connection. There are many programs available to decompress .zip files, in this exercise, we will use a trial version of Aladdin System's StuffIt Expander. If you need instructions on installing this software please see the appendix following this exercise.*
- ❑ Double-click on the **meshr.zip** file. This opens the StuffIt Expander program. A StuffIt Tutorial dialog box will appear that asks if you would like to open the archive for viewing or immediately expand the content. Select **Expand**.

Web Sites



For more information about StuffIt Expander from Aladdin Systems, visit

<http://www.stuffit.com/>



Exercise A: Find and Import Data

1. Locate Center shoreline data sets (continued)

- ☐ Another StuffIt Tutorial dialog box will appear asking you to select a destination for Expanded files. Choose **Same As Original**. This will uncompress the files into the same folder where the zip file resides, C:\Student\Coastal_GIS folder.
- ☐ **Open ArcCatalog** by selecting **Start > Programs > ArcGIS > ArcCatalog**.
- ☐ In ArcCatalog, click on the **Connect to Folder** button . Navigate to the c:\student directory and click **OK**. Double-click on this new folder in the table of contents and then double click on the **Coastal_GIS** folder.
- ☐ You will see that there is a meshr folder with two shapefiles in this directory: meshrln is the Maine shoreline represented as polyline features, meshrpl is the same shoreline represented as polygon features. For this exercise, you will only need the meshrpl shapefile. Select the **meshrln** shapefile and click on the **Delete** button . Click **yes** in the subsequent dialog.
- ☐ Minimize ArcCatalog when you have finished.

Did You Know?

You should always use ArcCatalog to delete, copy, or rename spatial data sets. Shapefiles, coverages, and feature data sets are composed of many associated files as well as hidden links to these files. Using Windows Explorer could cause corruption in your data sets, ArcCatalog will not.



Exercise A: Find and Import Data

2. Use Internet to access Digital Chart of the World data

- ▶ *Another tool available to you is Digital Chart of the World (DCW) data. The data can be purchased from ESRI directly or you can download some of the data on-line. One such download site is maintained by Penn State University.*
- ☐ Maximize Internet Explorer and type in the Web address **www.maproom.psu.edu/dcw/**.
- ▶ *This site provides an easy-to-use tool for selecting the data you are interested in.*
- ☐ On the map, select **North America** and then choose **Maine** from the scroll list that appears on the right-hand side of the screen. Select **Continue**.
- ▶ *This takes you to a screen that gives you three choices: download data, create and view an image of the data layer, or download latitude/longitude points for the outline of the state.*
- ☐ Select the **Download Data** option by clicking on it.
- ? The DCW shoreline data are at a 1:1,000,000 scale. Would these data be more detailed or less detailed than 1:24,000 scale data?

Did You Know?

The Digital Chart of the World was a project taken on by ESRI to create GIS data for the Defense Mapping Agency for navigational use by pilots and air crews while en route. It uses Operational Navigation Charts compiled by the U.S., United Kingdom, Canada, and Australia. The original database was published in 1992 at a scale of 1:1,000,000.



Exercise A: Find and Import Data

2. Use Internet to access DCW data (continued)

- ▶ *By clicking on the Download Data option you are taken to a page that lists all the data available to download for the state of Maine. While there is a great deal of data here, you are only interested in the coastal boundaries of the state. In the message at the top of the screen you will find that by selecting none of the boxes listed you will download the state outline, exactly what you want.*
- ☐ Select none of the boxes in the list and click the **Continue** button in the lower right-hand corner of the page.
- ▶ *The next page details exactly what you are downloading. Under Selected Layers it should tell you that by selecting no data you will receive the state boundary.*
- ☐ Under Data Compression Type you tell the system what type of computer system you are using. Select **PC/NT**.
- ☐ You do not need to worry about an ArcView Project so make sure that option is set to **None**.
- ☐ Now click the **Compute Data** button at the bottom left-hand corner of the page.

Web Sites

In addition to the DCW, the Penn State Maps Library contains links to many other forms of geospatial data. Visit the site at

www.libraries.psu.edu/maps/



Exercise A: Find and Import Data


2. Use Internet to access DCW data (continued)

- ▶ *The next page lists the files that were exported and gives you a link on the right-hand side of the page where you can download the data. It also gives instructions on how to uncompress the data once you have downloaded it.*
- ❑ **DO NOT** click the **Download Coverages** link. To save time, this data set has been included in your Student folder under the **Coastal_GIS** directory with your other Maine data.
- ❑ Minimize Internet Explorer.
- ❑ Maximize **Windows Explorer** and navigate to the folder where you downloaded the data. Once you have located the downloaded file, double-click on it. This will open **StuffIt**. Uncompress the file using the same process you used previously to Uncompress the .zip file. Extract the files to the **Coastal_GIS** directory.
- ❑ Minimize Windows Explorer and maximize **ArcCatalog** and navigate to the **PSU_DCW_meshr** folder under the **Coastal_GIS** folder in the table of contents. Notice that the file you just uncompressed does not appear. ArcCatalog does not show .e00 files by default. You need to modify the default setting to view them.
- ❑ Click on **Tools > Options**. Under the **File Types** tab, click **New Type**. For File Extension, type **.e00**. For Description of Type, enter **ArcInfo Interchange Format**. Click **OK** and **OK** again. You should now be able to see the .e00 file.
- ❑ You may need to refresh your screen by going to View > **Refresh** or hitting the F5 button.



Exercise A: Find and Import Data

2. Use Internet to access DCW data (continued)

- ▶ *ArcCatalog does not see the .e00 file by default because it is not really a geographic file. It is a simple file designed for exchanging data. To be able to use the data contained within the .e00 file you must import it into ArcGIS.*
- ❑ Open ArcToolbox by either clicking on the **ArcToolbox** button  at the top of ArcCatalog or by selecting **Start > Programs > ArcGIS > ArcToolbox**.
- ❑ In ArcToolbox, select **Conversion Tools > Import to Coverage > ArcView Import From Interchange File**. This opens the import tool that will allow you to convert the data from .e00 format to an ArcInfo coverage that you can use in ArcGIS.
- ❑ In the tool's dialog box, for Input File, browse to your student folder where the downloaded .e00 file resides, or you can drag the file from the ArcCatalog interface into this box. For Output data set, browse to your Coastal_GIS folder and give it a name. Click **OK** to complete the conversion.
- ❑ In ArcCatalog, navigate to the **Coastal_GIS** folder where you saved the converted data. Select it and view it by selecting the **Preview** tab. You should now have the DCW shoreline for Maine. Notice it is in ArcInfo coverage format.
- ❑ When you have completed this process, minimize ArcToolbox and ArcCatalog.

Exercise A: Find and Import Data

3. Download data sets using FTP

- ▶ *Another way an organization may distribute data is through the use of File Transfer Protocol or **FTP**.*
 - ☐ In your browser, type the following address, **ftp://spo.nos.noaa.gov/datasets/shoreline**. This **URL** will take you to the NOAA Special Projects Office.
 - ☐ You will notice four files in this directory of the FTP site. Start looking for the data by double-clicking on the **readme.txt** file. This file gives you a great deal of introductory information about the data contained here, but it doesn't tell you specifically where you can find data on Maine. It does refer you to the document called **datadict** in the docs directory. Close the file.
 - ☐ Now open the **docs** folder by double-clicking on it. This opens to show you three files. Double-click on the **datadict** file and determine which data set you need to download to obtain the coast of Maine.
- ? Which data set contains the Maine coast? _____

Glossary Terms

FTP – File Transfer Protocol: a fast, efficient method for retrieving data sets from a remote server

URL – Universal Resource Locators: short strings that identify resources in the Web: documents, images, downloadable files, services, electronic mailboxes, and other resources.



Exercise A: Find and Import Data

3. Download data sets using FTP (continued)

- ▶ *If you look under the Geographic Extents of the Products section of the document you will see a description of the various sections of the larger data set. You will need ec80_05 – Point Judith to the Saint Croix River. Now you will download the data.*
- ❑ Close the datadict file and then click on your browser's **back** button to return to the page listing the three folders and the readme.txt file.
- ❑ To download the data, double-click on **gz_files**.
- ▶ *In this folder you will find all of the Medium Resolution Shoreline data compressed and ready for download.*
- ❑ Now find the file that contains Maine shoreline data, ec80_05. Notice that it has a couple of extensions included in the name, **.e00** (ArcInfo's interchange format) and **.gz** (a compression utility extension).
- ❑ **DO NOT** download this data set. To save time, this data set has been included in your Student folder as uncompressed e00 file, ec80_05.e00.

Glossary Terms

.gz – The extension associated with files that have been compressed with the UNIX compression utility gzip.

.e00 – The extension associated with files in ArcInfo's "interchange" format, which is used to exchange geospatial data among users of various GIS packages.



Exercise A: Find and Import Data

3. Download data sets using FTP (continued)

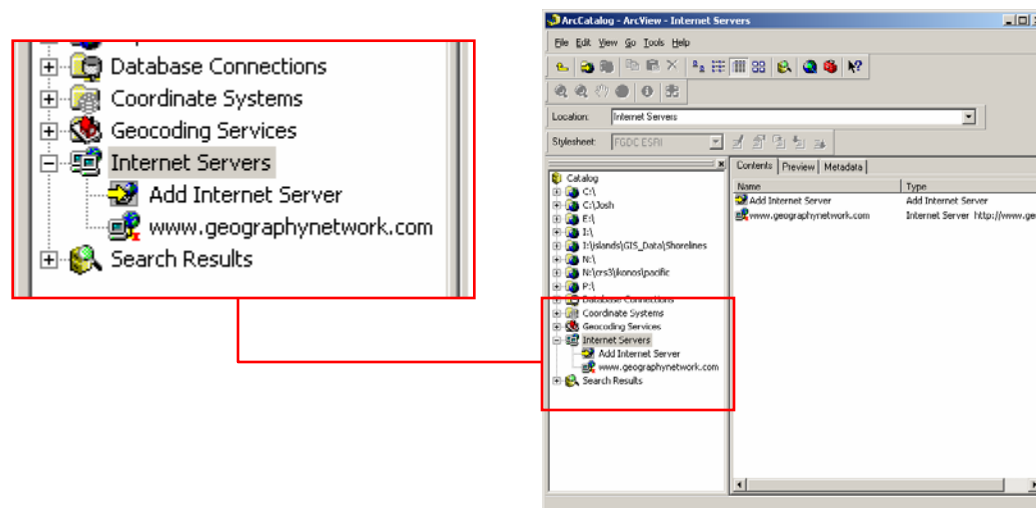
- ☐ Once the download is complete, make sure all of the download dialog boxes are closed.
- ▶ *Normally, you would be asked to download the associated metadata record for this data set, but there isn't any. Instead, the readme.txt file that can be accessed from the main page contains limited information about the shoreline data sets as a whole. This information could be used to create your own metadata record in ArcCatalog.*
- ☐ Close Internet Explorer.
- ☐ Using the skills gained from previous steps, import the .e00 file into an ArcInfo coverage so that it can be used in ArcGIS.
- ☐ Once you have imported the file, use ArcCatalog to view it using the Preview tab. You should now have the Medium Resolution Digital Vector Shoreline for the Northeast, including Maine.



Exercise A: Find and Import Data

4. Use ArcCatalog to access Internet data

- ☐ Open ArcCatalog if it is not already open.
- *ArcGIS incorporates the ability to access data stored remotely on servers that are running ArcIMS, ESRI's Internet map-serving technology. If the ArcIMS server is set up to share data, then users can access data from that site without downloading the data onto their local hard drive or network. This means you can access data you did not create, allowing you to use the work of others for your own projects.*
- ☐ Scroll down the list of directories in the table of contents. Double-click on **Internet Servers** to expand the directory.



Did You Know?

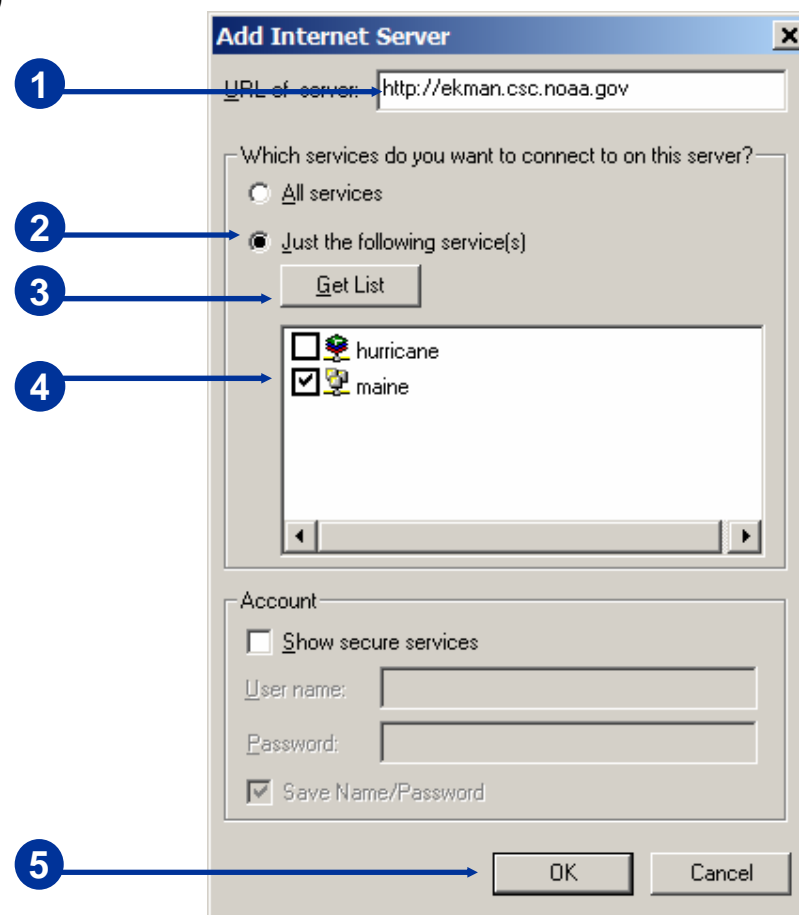
There are two types of ArcIMS “services,” image services and feature-streaming services. When accessing an image service you are asking the software to send you a picture of the data you are interested in. When you access a feature service the software compresses the actual data and sends it to your computer where you can edit the data as your own.

Exercise A: Find and Import Data

4. Use ArcCatalog to access Internet data (continued)

- ❑ Under the Internet Servers directory, double-click on **Add Internet Server**.

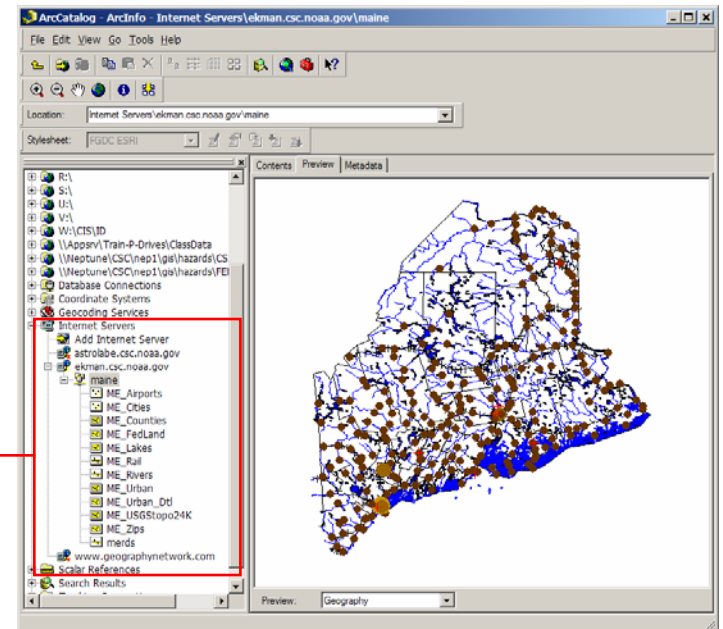
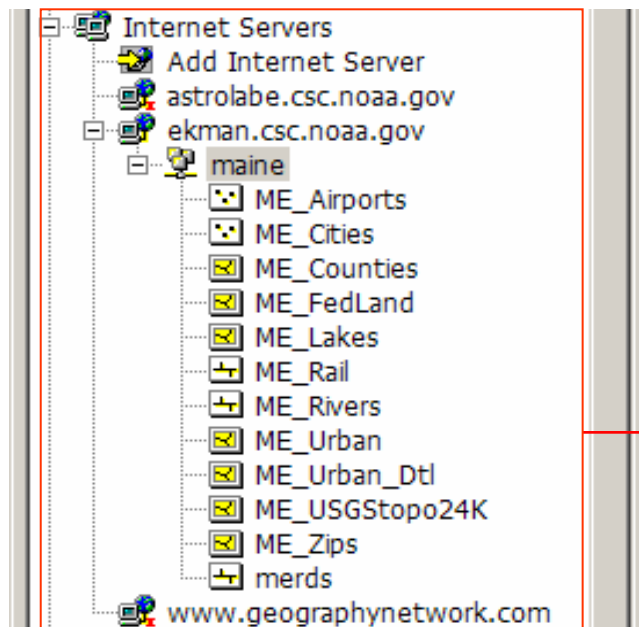
- 1 Enter the URL of the remote data server:
http://ekman.csc.noaa.gov.
- 2 Choose to connect to **Just the following service(s)**.
- 3 Click on **Get List**.
- 4 From the list of services, select **Maine**.
- 5 Click **OK**.



Exercise A: Find and Import Data

4. Use ArcCatalog to access Internet data (continued)



- ▶ Once you have successfully connected to the remote data server, you can preview the data in ArcCatalog or even add the data to an ArcMap map document file. The data are already in a format that is ArcGIS compatible, so there's no need to decompress or import the data sets.
- ❑ Click on the **Preview** tab, double-click on ekman.csc.noaa.gov in the table of contents; finally, click on Maine. All of the data sets present in the directory will be displayed. Click on the **Contents** tab to see a listing of all the data sets.



Exercise A: Find and Import Data

5. View coastal data in ArcMap

- ▶ *You have now brought many different data sets representing the Maine coast into ArcGIS. You can see some individual differences, but to really understand your data you need to look at them together.*

- ☐ Open ArcMap by clicking on the **ArcMap** button  in ArcCatalog.
- ☐ In ArcMap select the **Add Data** button  or go to **File > Add Data**.
- ☐ In the Add Data dialog box, navigate to the **Coastal_GIS** folder, where your Maine data are located. To select multiple files, hold the Control key and use the mouse to click on each of the data sets. You should include the data from the Center, the Special Projects Office, and the DCW data. Once you have these three data sets highlighted, click the Add button. You should see these added to the ArcMap view.
- ☐ To add the data from the ArcIMS Web site, click the **Add Data** button again, but this time, under the Look In pull-down menu, scroll down until you see **Internet Servers**. Click on **Internet Servers** and then double-click on <http://ekman.csc.noaa.gov>. You should see the Maine ArcIMS site listed; double-click on it.
- ☐ This will bring up a list of available data sets. Select the **ME_Counties** file and click **Add**.


Did You Know?

Some of the data sets that you downloaded are in ArcInfo coverage format. ArcGIS 8.3 allows you to view these data sets, but you cannot edit them. Don't fret; ArcToolbox contains tools that will allow you to convert these files to a geodatabase or a shapefile for editing.



Exercise A: Find and Import Data

5. View coastal data in ArcMap (continued)

- ☐ You should now see all four data sets in the ArcMap view.
- ☐ Use the **Zoom In** tool  to zoom into the coastal areas and examine the differences among the various coastlines. Each of the four data sets shows a different shoreline.
- ▶ *You may need to change the symbology of the different data sets to clearly delineate each one. To do this, simply click on the layer's symbol. This will bring up the **Symbol Selector** dialog box. Under Options on the right hand side of the screen you can change the color of the symbols, making them easier to see. Experiment with different options, and find what works best for you.*
- ▶ *As you can clearly see, differences in data could play a large part in the type of analysis you could do. In the next section you will examine the data more closely to see what types of work you could do with each. Once you are done looking at the data, close ArcMap without saving any changes.*
- ☐ Close all applications without saving.

**END OF EXERCISE A**

Exercise A: Find and Import Data

Exercise Summary

There are several steps involved with bringing data into a GIS. Not only do you have to know where to locate the data, but you also need to know how to document that process, and finally how to manage the data in an efficient way.

In this exercise, you browsed various data sources available on-line and downloaded the spatial data of interest for use in the GIS. Then, you were able to view and manage the data using ArcCatalog. ArcCatalog helps to make accessing and managing the geographic data simple.

Answers to Exercise Questions

p. 12

Can you think of any other Internet sites for downloading geospatial data?

Individual answers will vary.

p. 16

The DCW shoreline data are at a 1:1,000,000 scale. Would these data be more detailed or less detailed than 1:24,000 scale data?

The 1:1,000,000 scale shoreline data set will be less detailed. This is a small-scale data set that is better suited for depicting the shorelines of the entire world, as opposed to a large-scale data set that would be better suited to depict the shoreline of a smaller area.

p. 20

Which data set contains the Maine coast?

The shoreline data set that contains the State of Maine is ec80_05.



Exercise A: Appendix

Aladdin System's StuffIt Expander software:

Installation Guide:

- Double click on the **StuffItStandard85Setup.exe** file located in your C:\Student\Coastal_GIS folder
- Accept all default settings in the installation dialog
- Uncheck the "View special offer" box on the final screen and click Finish

Associating StuffIt with ZIP files:

- Open Windows Explorer
- Go to Tools >Folder Options and select File Types
- Under the Registered file types box scroll down to the ZIP extension
- If the ZIP extension does not have the file type "StuffIt ZIP Archive" single click on it
- Under the Details for 'ZIP' extension box at the bottom half of the page click on the Change button
- Under Programs > Recommended Programs click StuffIt for Windows 8.5 and click OK
- Close the Folder Options dialog box



Discussion: Spatial Data Acquisition

- What data sources would be useful to compile base layers for coastal management?
- Have you ever had any data that you could not use in your GIS because they were not in the proper format?
- What are some other data issues you should consider?

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.

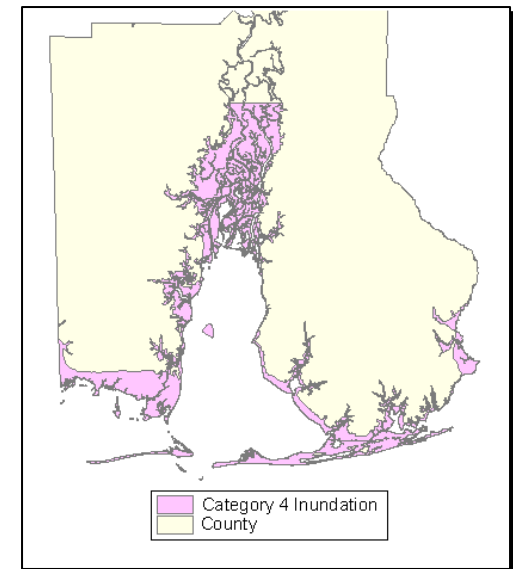
Lecture: Introduction to Metadata

What is Metadata?

- Metadata is data about data
- Metadata describes the characteristics of the data
 - Who produced it
 - How it was produced
 - The currentness of the data
 - The spatial parameters of the data set
 - Feature and attribute information
 - Plus much more
- Without proper documentation, no data set is complete

Identification_Information
Citation
Citation_Information
Originator: NOAA Coastal Services Center
Publication_Date: 19971131
Title: Hurricane Storm Surge
Geospatial_Data_Presentation_Form: Map
Publication_Information
Publication_Place: Charleston, SC
Publisher: NOAA Coastal Services Center
Larger_Work_Citation
Citation_Information

**This is a small
part of the
metadata for
this.** →



Lecture: Introduction to Metadata

Who Benefits from Metadata?

For DATA DEVELOPERS, metadata helps...

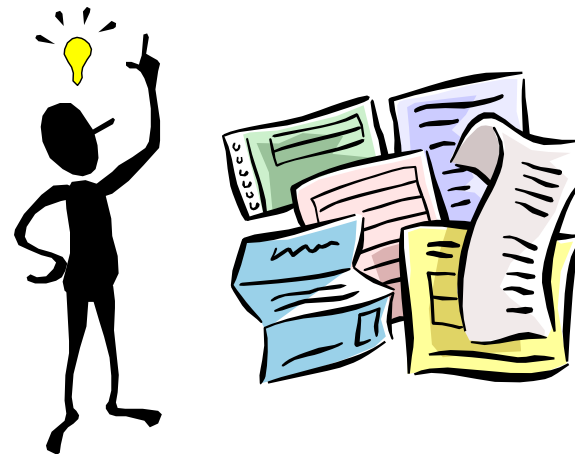
- Avoid duplication
- Share reliable information
- Publicize efforts
- Reduce workload

For DATA USERS, metadata...

- Facilitates understanding
- Focuses on key elements
- Enables discovery

For ORGANIZATIONS, metadata helps...

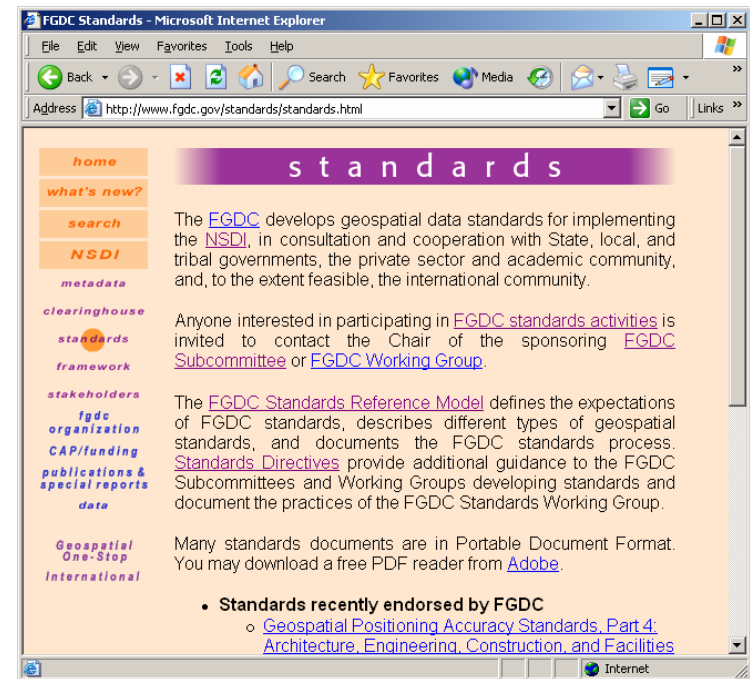
- Protect investments
- Create an institutional memory
- Allow sharing of data with other agencies
- Reduce costs
- Limit potential liability



Lecture: Introduction to Metadata

Metadata Standards

- Think for a moment how hard it would be to...
 - Bake a cake without standard units of measurement
 - Put gas into your car without standard nozzle sizes
 - Plug a lamp into a socket without standard electrical outlets
- A metadata standard ensures a level of consistency for data documentation



<http://www.fgdc.gov/standards/standards.html>



Lecture: Introduction to Metadata

FGDC

- Federal Geographic Data Committee
- Organized in 1990 under the Office of Management and Budget
- Promotes the coordinated use, sharing, and dissemination of geospatial data on a national basis

“Federal agencies and organizations receiving federal funds must document all geospatial data using the FGDC Content Standard for Digital Geospatial Metadata (CSDGM).”

- Executive Order 12906, 1994



<http://www.fgdc.gov>



Lecture: Introduction to Metadata

Content Standard

- **CSDGM** — Content Standard for Digital Geospatial Metadata
- Serves as a uniform summary description of the data set
- Establishes names of data elements and compound elements
- Defines information about values provided for data elements

The Content Standard utilizes...

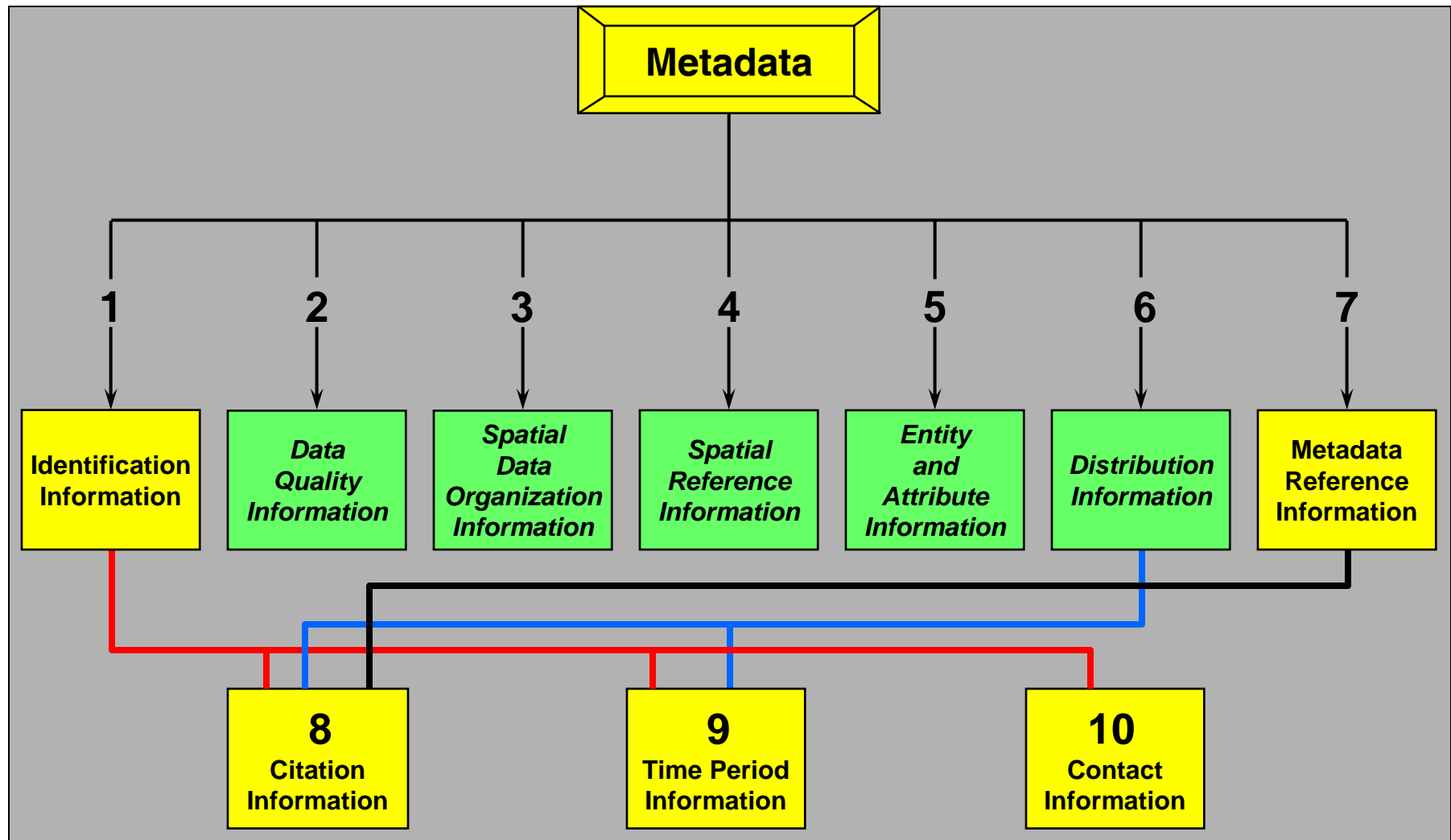
- Common terms
- Common definitions
- Common language
- Common structure

The Content Standard helps the user determine...

- If a set of geospatial data is available and fit for a particular use
- How to access and transfer the data set



Lecture: Introduction to Metadata



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FGDC's Metadata Workbook

- Defines the 334 metadata elements.
- Consult this document for detailed instructions on how to fill out metadata.
- Can be found on-line:
www.fgdc.gov/metadata/meta_workbook.html



Exercise B: Using Metadata to Determine Suitability

Background

You have downloaded the data that you needed to show your superiors you could get the job done. Now you need to make sure the data remain useable for years to come. You also want to make sure you will have the detailed information needed to share your data with other organizations. To do this, you need to look closely at the metadata and make sure it is up-to-date and correct.

As the county's coastal manager, you have many projects on your desk. You need to review each project proposal to see if the data you have are appropriate. You will analyze the appropriate metadata and use it to decide if the data are suitable for various coastal-related projects.

Goal

After hearing the lecture and working through the exercises, you will be able to read and understand the information metadata provides about data.

Objectives

1. Import metadata for previously downloaded data
2. Analyze the metadata
3. Determine if the data are suitable for different projects



Exercise B: Using Metadata to Determine Suitability

Summary of Process Steps

1. **Explore Different Types of Metadata** – import associated metadata files for the shoreline data that you downloaded in the last exercise
2. **Analyze Metadata** – use metadata to answer specific questions about the data previously downloaded
3. **Use Metadata to Determine Suitability** – use the metadata to assess the data's usability in different scenarios

Data

No spatial data will be provided for this exercise.

Tools to Use

- ArcCatalog
- Internet Explorer



Exercise B: Using Metadata to Determine Suitability

1. Explore different types of metadata

- ▶ *Many data sets do not have dedicated metadata per se, but instead have information about the data set that can be accessed at the location where you downloaded the data. This means that you may have to do a little clever detective work. Only one of the data sets you downloaded has an associated metadata file that can be viewed in ArcGIS. For the other two files, you will have to go back on the Internet to find out more information about the data.*
- ❑ You will start with the data that you downloaded from the NOAA Coastal Services Center. Fortunately, this data set does have associated metadata. It even conforms to FGDC standards. Open ArcCatalog by clicking on **Start > Programs > ArcGIS > ArcCatalog**.
- ❑ In the table of contents, navigate to the **Coastal_GIS** data folder. Click on the **meshrpl** data set and then click on the **Metadata** tab. On the Metadata toolbar, set the stylesheet to **FGDC Classic**.
- ▶ *Notice that very few of the metadata fields are filled in. This is because the associated metadata that you downloaded is in a .met text format that is not recognized by ArcCatalog. You will need to import the metadata into a format that ArcCatalog can read.*


Did You Know?

There are many reasons why some data sources do not have associated metadata. Sometimes, the data must be exported from a larger data set in an automated process. Depending on the complexity of the site, you may not be able to get a customized metadata record for the data.



Exercise B: Using Metadata to Determine Suitability

1. Explore different types of metadata (continued)

- ☐ Click on the **Import metadata** button . In the subsequent dialog, set the format to **FGDC CSDGM (TXT)** and click on the **Browse** button. Navigate to the **c:\student\Coastal_GIS** directory and select the **meshr.met** file (NOTE: you may have to set the file type to **All Files (*.*)**). Click **Open** and then **OK**.
- ▶ *Notice that most of the appropriate metadata fields are filled in. This only works with files that conform to the FGDC CSDGM standard.*
- ☐ Minimize, but do not close, ArcCatalog.
- ☐ Open Internet Explorer. Navigate to the following site: **ftp://spo.nos.noaa.gov/datasets/shoreline**
- ▶ *Remember in the last exercise when you learned that these SPO shoreline data sets do not have a true metadata file? There is, however, a text file that contains information on the data sets contained on the site.*
- ☐ Double-click on **readme.txt**. Review the document. Once you have finished, click **File > New > Window**. In the new window, enter the following URL: **http://www.maproom.psu.edu/dcw/**. Click on the **About DCW** and **Questions (FAQ)** links. These documents contains pertinent information about the DCW shoreline that you downloaded. Keep both of the Internet Explorer browser windows open because you will use them in the next step.



Exercise B: Using Metadata to Determine Suitability

2. Analyzing metadata

► *In this part of the exercise, you will take a closer look at the metadata for all of the downloaded data sets. You will learn what to look for and where it is located within the metadata. This will provide you with an invaluable tool for finding data that will be useful to you in your future GIS projects.*

❑ For each of the data sets, answer the following questions:

	DCW	SPO	Coastal Services Center
What is the horizontal datum of the data?			
What is the scale of the data?			
How many sources do the data have?			
What is the date of the data?			
Who is the publisher of the data?			
What are some of the major attributes of the data?			



Exercise B: Using Metadata to Determine Suitability

3. Determine suitability

- *Now that you have taken a closer look at the data and have a better understanding of exactly what each set represents, it is now time to use that knowledge. You have three project requests on your desk that need to be considered.*

- ? The first request is for general regional mapping. The state would like some general information about the coast for its Web site and wants you to provide shoreline data from your county. Based on what you learned from the metadata, what data set would be best for this purpose? _____

Why? _____

- ? Next, the county has just passed new zoning laws that restrict building in and along the coastal zone. One of the main accomplishments is the establishment of a setback ordinance. The county hopes to preserve its shoreline and reduce costs after storms by limiting construction near the water's edge. What data would work well for this project? _____

Why? _____



Exercise B: Using Metadata to Determine Suitability

3. Determine suitability (continued)

- ? Finally, after several severe winter storms over the past few years and a great deal of property loss, the citizenry and the county commissioners want a beach erosion study completed by your office. Which data set would you use to complete such a study? _____

Why? _____

- *Keep in mind all you know about the different data sets. Think about size, draw time, resolution, accuracy, etc.*

- ? *Do you think you have the right data for these projects or would you like different data?* _____

- ☐ Close all applications.



END OF EXERCISE B



*Exercise B: Using Metadata to Determine Suitability***Exercise Summary**

In this exercise, you began by understanding what metadata really is. Then, you learned about the value of metadata and examined the different metadata formats available within ArcCatalog. You were then asked to import existing metadata in a usable format using the ArcCatalog software. Next, you were asked to analyze the metadata and answer questions that could be found within the metadata itself. Finally, you used the metadata to determine the usability of the specific data for different scenarios.



Exercise B: Using Metadata to Determine Suitability

Answers to Exercise Questions

Page 42	DCW Shoreline (Ponet)	SPO Shoreline (ec80_05)	Center Shoreline (Meshrpl.shp)
What is the horizontal datum?	World Geodetic System 1984	NAD 1983	NAD 1927
What is the scale?	1:1,000,000	1:70,000	1:5,000
How many sources?	One	Two	One
What is the date?	1993	August 24, 1994	1986
Who is the publisher?	Defense Mapping Agency	NOS	NOAA
What are some of the major attributes?	Polygonal boundary for the state of Maine	NOS chart catalog number from which the arcs were captured	Shoreline; dike or levee; pier, ramp, dock

Page 43		
Regional Mapping	Meshrpl.shp	Most complete and accurate data set, much larger scale than other data sets.
Setback Ordinance	Meshrpl.shp	Once again, there is much greater detail of the shoreline in this shapefile, which would allow for more accurate delineation of the shoreline.
Page 44		
Beach Erosion	ec80_05	This data set covers the entire coast of Maine and would allow for the analysis needed to map beach erosion



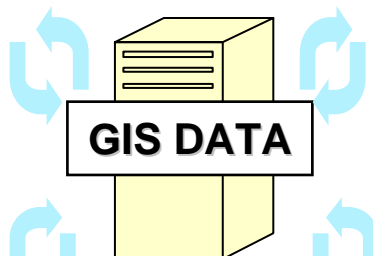
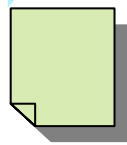
Discussion: Suitability of the Data

- Which data set did you choose for each project?
- List the pros and cons of various resolutions of data.

[illegible]

Module Summary

This is just the beginning of what can be done using a GIS. You have now learned to acquire basic spatial data, as well as the accompanying metadata. You were then able to load both the spatial data and metadata into your GIS by downloading them from a variety of organizations via the Internet. You were then able to use the data to determine the suitability of a site.

**MAPS****GIS User****GPS****DATABASE, TEXT FILE**